Trajectories of borderline features in adolescents: A three-wave longitudinal study testing the effect of gender and self-disgust over 12 months

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ABSTRACT

Recent research has emphasised the need to study the development of borderline features in adolescents prospectively. Self-disgust is feeling repugnance for aspects of the self and studies have supported its association with borderline features. This study aimed to identify different trajectories of the development of borderline features in adolescents over 12 months and test the longitudinal impact of self-disgust and gender. Participants were 158 adolescents ($n = 110$ girls) with a mean of 15.44 years ($SD = 0.79$), assessed in three moments with a six-month interval. Gender differences were found on borderline features and similar stable trajectories were exhibited for the total sample, boys and girls. Adolescents with higher and lower borderline features presented opposite trajectories: while the lower group decreased borderline features over time, the higher group increased. A latent growth model with the total sample revealed heterogeneity in basal levels and a relatively homogeneity on growth rates of borderline features. Self-disgust feelings presented a significant effect on basal levels and growth rates indicating that it might influence the developmental trajectory of borderline features. These findings highlight the importance to address self-disgust when dealing with borderline features in youth since it seems to be a risk factor.

1. Introduction

In the last decades, research on borderline features in adolescents has increased, and critical studies have been conducted identifying risk factors, relevant psychological mechanisms and precursors of borderline personality disorder (BPD; Paris, 2014). BPD is a personality disorder characterised by a pervasive pattern of instability in self-image, emotions and social relationships, feelings of emptiness and abandonment, self-destructive behaviors and impulsivity (American Psychiatric Association, 2013). Several authors have defended that borderline features can be identified in adolescence and that BPD symptoms usually first appear in youth (Chanen & Kaess, 2012; Paris, 2014).

Retrospective data or correlations of proximal variables of adults with BPD are insufficient and present some limitations (e.g. reports might reflect the current symptoms instead of its cause, the borderline features themselves might predispose adverse reports; Carlson et al.,

2009). Accordingly, longitudinal studies are essential to understand the development of borderline features and identify causal relationships between variables. Indeed, prospective data are crucial to shed light on developmental paths of dysfunctional personality traits (Burke & Stepp, 2012; Paris, 2005). Some authors have conducted important analyses about trajectories and antecedents of borderline features in adolescents, exploring different predictors (Chanen et al., 2004; Greenfield et al., 2014; Haltigan & Vaillancourt, 2016; Winograd et al., 2008; Wright et al., 2016).

Evidence shows that only around 40% of adolescents with BPD maintained the diagnosis two years later (Chanen et al., 2004), possibly indicating a not so stable BPD course. Adding to this evidence, Bornovalova et al. (2013) showed a small but significant decline in BPD traits from age 14 to 18. Moreover, Haltigan and Vaillancourt (2016) analysed intra-individuals and interpersonal risk factors in children and adolescents and the association with trajectories of borderline features. The

authors identified three distinct trajectories: elevated/rising, intermediate/stable and low/stable, demonstrating the heterogeneous course of borderline features in early adolescence. On the other hand, Greenfield et al. (2014) found a high percentage of BPD continuity in suicidal youth. In this population, BPD diagnosis was consistent from baseline to 4 years later in 76% of participants. Besides trajectories, in general, prospective studies indicated that BPD symptoms are related to future poor psychosocial functioning, increased sexual risk behaviors, lower adult role functioning, social functioning, life satisfaction, educational and occupational attainment and less partner involvement (Choukas-Bradley et al., 2020; Winograd et al., 2008; Wright et al., 2016).

Nevertheless, not so many longitudinal studies have explored the effect of psychological mechanisms (e.g., self-digust, self-compassion, acceptance, rumination) on the evolution of adolescents' borderline features. Sharp et al. (2015) presented the first evidence of the longitudinal effect of experiential avoidance on borderline features one year later when controlled baseline levels of borderline features, anxiety, and depressive symptoms. This study emphasised the relevance of exploring the effect of underlying psychological mechanisms besides sociodemographic and family variables. Some years before, a prospective study with a risk sample of 162 participants, who were assessed from childhood to adulthood, had already highlighted the significant effect of disturbances in self-functioning on later borderline features. Particularly, self-representation at age 12 mediated the relationship between early attachment disorganisation (12–18 months) and BPD symptoms at age 28 (Carlson et al., 2009). Some results in this line were also reported by Wright et al. (2016). They found a unique association over time between BPD and self-perception (social self-worth, self-competence, and peer-victimisation) in adolescent girls when controlled depressive symptoms and conduct disorder features.

The way one sees and relates with him/herself seems to be central to self-identity development, and psychological processes might have a unique contribution to the development of personality traits. Focusing on exploring regulation mechanisms and internal processes with the potential to help to decrease borderline features in adolescents have been defended and encouraged (Carlson et al., 2009). Considering that humans can think about themselves and create a self-image, they are able to feel disgust towards aspects of the self (personality, behaviors, body; Carreiras, 2014; Ille et al., 2014; Overton et al., 2008). Self-disgust has distinct components: cognitive, emotional, physiological, and behavioral. Cognitions and feelings of self-disgust include profound grief for the self, a desire to escape from internal aspects, negative self-critical thoughts, feeling inferior and diminished when compared to others and feeling hate or repugnance for oneself. Studies with adults diagnosed with BPD have argued that self-disgust might be central to this disorder. These patients tend to exhibit a negative self-to-self relationship, with marked self-criticism and increased feelings of self-disgust and self-loathing (Guiomar, 2015; Ille et al., 2014; Rüsch et al., 2011). Studies on borderline features and self-disgust are scarce in the adolescent population, and in the last year, Carreiras, Castilho, and Cunha (2020) showed that self-disgust had a predictive effect on borderline features in adolescence, particularly for girls.

This study aimed to identify and analyse different trajectories of the development of borderline features in adolescents over 12 months. The second aim was to test the longitudinal impact of gender and cognitions and feelings of self-disgust on borderline features in adolescence, considering the need to explore further the effect of psychological mechanisms on developing dysfunctional personality traits in early ages.

2. Method

2.1. Participants

At wave 1, participants were 491 adolescents, 311 (63.3%) females and 180 (36.7%) males. Their ages ranged between 14 and 18, with a mean of 15.49 years (SD = 0.89). At wave 2 there was a dropout rate of

31%, and at wave 3 only 158 participants completed the questionnaires, 110 (69.6%) females and 48 (30.4%) males. Their ages were between 14 and 17 years old ($M = 15.44$, $SD = 0.79$) and the mean of years of education was 10.23 ($SD = 0.54$). Non-significant gender differences were found for age ($t_{(156)} = 0.06$, $p = .95$) and years of education ($t_{(156)} = 0.08$, $p = .94$).

Comparisons between completers ($n = 158$) and dropouts ($n = 333$) showed non-significant differences for gender (X^2 (1, $N = 490$) = 2.10, $p = .15$), age ($t_{(489)} = 0.79$, $p = .43$), years of education ($t_{(489)} = -1.00$, $p = .32$) and self-disgust cognitions and feelings ($t_{(489)} = -1.03$, $p = .30$). However, borderline features were higher for dropouts ($t_{(489)} = -2.41$, $p = .02$) than for completers.

2.2. Procedures

The participants of this study were recruited in public schools from the centre and north regions of Portugal. We contacted the school's head teachers via e-mail to present the study. Then, we went to schools that agreed to collaborate. Parents and adolescents provided their written informed consent after being informed about the study aims, confidentiality and voluntary participantion. The main inclusion criterion was age between 14 and 18. The exclusion criteria were: being in the 12th grade (so we could easily follow-up in the next year), and having cognitive impairment. Adolescents completed the quesionnaires in the classroom, in the presence of a researcher to provide any clarification and guarantee independent responses. Data were collected in three waves in one year (2019–2020), with a 6-month interval between them. Participants were 491 in Wave 1, 339 (69%) in Wave 2 and 191 (39%) in Wave 3. We only considered for this study the 158 participants who completed all self-report questionnaires in the three waves. One of the reasons for this high dropout rate was the lockdown after the Covid-19 pandemic outbreak, which made us collect the last wave through online questionnaires (LimeSurvey platform). The online data collection reflected less adherence and a decrease of response rates.

2.3. Measures

The Borderline Personality Features Scale for Children (BPFS-C; Sharp et al., 2014; Portuguese version by Carreiras, Loureiro, et al., 2020) is a unidimensional self-report questionnaire to assess borderline features in adolescents. In the current study, Cronbach's alpha of total scale was 0.80 in the first wave, 0.87 in the second and 0.86 in the third.

The Multidimensional Self-Disgust Scale for Adolescents (MSDS-A; Carreiras et al., 2022) is a self-report questionnaire designed to assess self-disgust, including four subscales: Defensive activation, Cognitive-emotional subscale, Avoidance, and Exclusion. We only used cognitive-emotional subscale because we were interested in the internal psychological mechanisms of self-disgust more than on the physiological activation of such emotion or related behaviors. In the present data, the Cronbach's alpha was 0.94 for the Cognitive-emotional subscale.

2.4. Data analyses

Data were analysed using IBM SPSS Statistics version 23 and AMOS version 22. Kolmogorov-Smirnov test and skewness (*Sk*) and kurtosis (*Ku*) values were analysed to test normality assumption. Descriptive statistics and frequencies were performed to explore demographic variables. Student's *t*-tests and repeated measures ANOVA were conducted to test differences between groups and waves. Sphericity assumption was analysed through Mauchly's test of sphericity. Pearson's correlation coefficients were used to examine correlations between variables. According to Dancey and Reidy (2017), correlations between 0.10 and 0.39 were considered weak; between 0.40 and 0.69 moderate; and above 0.70 strong. Effect sizes were calculated and interpreted according to Cohen (1988): *d* values between 0.20 and 0.49 were considered small, between 0.50 and 0.79 medium, and above 0.80 large.

Structural equation modelling (SEM) was performed to test a latent growth curve model (LGM). Structural equation modelling (SEM) was performed to test a latent growth curve model (LGM). This longitudinal analysis estimates the growth of borderline features over 12 months, using repeated measures from the perspective of an individual growth curve for each participant. The intercept factor represents the mean starting point of the outcome across the three time periods and thus describes the baseline level of the variable in the study (intercept mean) and its individual differences (intercept variance). The slope factor represents the average rate over time (slope mean) and individual differences in growth patterns (slope variance). A positive correlation between the intercept and slope factors means that individuals with greater initial values tended to have a higher growth. Conversely, a negative correlation reflects that individuals with greater initial levels present a lower growth. The following goodness of fit indices were used to examine the adequacy of the model: Comparative Fit Index (CFI), Tucker and Lewis Index (TLI), the Incremental Fit Index (IFI), and the Standardised Root Mean Squared Residual (SRMR). Good adjustment was considered using the following cut-off points: CFI > 0.90; TLI > 0.90; IFI > 0.90; SRMR<0.08 (Hair et al., 2006; Hu & Bentler, 1999). The sample size for LGM should have at least 100 cases (Hamilton et al., 2003).

3. Results

3.1. Preliminary analyses

Kolmogorov-Smirnov test was non-significant for all variables. Additionally, considering the reference values for skewness and kurtosis ($Sk < 3$ and $Ku < 8$; Kline, 2011), the normality of data was assumed. Outliers were not eliminated to keep the natural distribution and variance and because they did not change the results.

Evolution of Borderline Features for Total Sample and by Gender.

Means and standard deviations of borderline features in the three waves are presented in Table 1. Adolescent girls exhibited higher borderline features than boys in all waves, with effect sizes ranging from 0.34 to 0.36.

For the total sample, significant differences in borderline features were found between waves, $F_{(2, 157)} = 3.61$, $p = .03$. Thus, Bonferroni post hoc test was conducted, but no differences were found between wave 1 and 2 ($p = .09$), wave 2 and 3 ($p = .06$) and wave 1 and 3 ($p = 1.00$). The same procedure was performed for boys and girls separately. In the group of boys, borderline features did not change across time, with non-significant differences between waves, $F_{(2, 47)} = 0.70$, $p = .50$. Girls showed different levels of borderline features in the three waves, $F_{(2, 47)} = 3.14$, $p = .05$. Again, Bonferroni post hoc test showed non-significant differences between wave 1 and 2 ($p = .09$), wave 2 and 3 ($p = .16$) and wave 1 and 3 ($p = 1.00$). The assumption of sphericity was not violated in our data in all ANOVA with repeated measures tests. These three trajectories are graphically represented in Fig. 1.

Table 1
Means (*M*) and standard deviations (*SD*) of borderline features in the three waves for the total sample, males and females. Student's *t*-test (*t*) for differences between groups and Cohen's *d* for effect sizes ($N = 158$).

	Total ($n =$ 158)	Males (n $= 48$)	Females ($n =$ 110)	*t* (df)	*d*
	M (SD)	*M (SD)*	*M (SD)*		
Borderline features W1	24.36 (6.57)	22.81 (6.40)	25.04 (6.56)	2.00* (156)	0.34
Borderline features W2	25.35 (7.46)	23.56 (6.81)	26.14 (7.62)	2.11* (156)	0.36
Borderline features W3	24.35 (7.20)	22.58 (7.03)	25.13 (7.09)	2.08* (156)	0.36

Note. *p < .05. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3. Borderline features measured by the Borderline Personality Features Scale for Children.

The associations between borderline features in the different time points were explored. The correlation between wave 1 and 2 was strong ($r = 0.68$, $p < .001$), as well as between wave 2 and 3 ($r = 0.73$, $p < .001$) and 1 and 3 ($r = 0.74$, $p < .001$).

Trajectories of Adolescents with Higher and Lower Borderline Features.

The sample was divided into two groups using the percentile 50 of the BPFS-C as a cut-off point. The group of lower borderline features was composed of 78 adolescents, whereas the group of higher borderline features was composed of 80 adolescents. The percentage of boys was higher in the first group (34.6%) than in the second (26.3%). Non-significant differences were found for age, $t_{(156)} = 0.51$, $p = .61$, and years of education, $t_{(156)} = 0.08$, $p = .94$, between groups.

Means, standard deviations and differences between adolescents with lower and higher borderline features are presented in Table 2. As expected, the two groups differed in borderline features in the three waves with large effect sizes. Considering the assessment points, the group with lower borderline features presented significant differences between waves, $F_{(2, 77)} = 14.65$, $p < .001$, specifically between wave 1 and 3 ($p < .001$) and wave 2 and 3 ($p < .001$). In its turn, the group with higher borderline features also presented significant differences between waves, $F_{(2, 79)} = 8.87$, $p < .001$. These differences were between wave 1 and 2 ($p = .02$) and wave 1 and 3 ($p < .001$). It is important to notice that the trajectory of each group is opposite. In the lower group, borderline features' levels decrease over time, whereas borderline features' levels seem to increase in the higher group. Both trajectories are presented in Fig. 1.

Predicting Changes in Borderline Features and Testing the Impact of Self-disgust and Gender Over 12 Months.

A LGM was performed for total sample. The non-conditioned LGM successfully fitted to the three measurement time points of borderline features: CFI = 0.99; TLI = 0.99; IFI = 0.99; SRMR = 0.01. Results showed that borderline features were heterogeneous between participants at baseline ($b = 33.45$; $SE = 4.78$; $Z = 6.99$; $p < .001$), around a mean level of 24.24 ($SE = 0.52$; $Z = 46.34$; $p < .001$). A significant change over time was found given the significant estimate of slope's mean ($b = 1.07$; $SE = 0.45$; $Z = 2.41$; $p = .02$). Additionally, the growth rate was homogeneous among adolescents considering the non-significant slope variance ($b = 7.77$; $SE = 4.40$; $Z = 1.77$; $p = .08$). A positive correlation between intercept and slope of 0.08 was found ($Z = 3.17$; $p = .68$), indicating that adolescents with higher initial borderline features tend to display higher growth rates.

Gender and self-disgust (cognitions and feelings) were included as predictors of the intercept and the slope factors. The goodness-of-fit indices of this conditioned LGM (Fig. 2) were adequate: CFI = 0.98; TLI = 0.95; IFI = 0.98; SRMR = 0.02. Results showed that gender had no effect on basal levels of borderline features ($b = 0.09$; $p = .20$), nor on the growth rates ($b = -0.02$; $p = .92$). On the other hand, self-disgust presented a significant impact on initial borderline features ($b = 0.61$; $p < .001$), which means adolescents with higher self-disgust presented higher borderline features at the baseline. Moreover, self-disgust had a significant effect on slope ($b = 0.36$; $p = .03$), indicating its impact on the evolution of borderline features.

4. Discussion

Longitudinal studies have a great potential to identify trajectories, causal relationships, and predictors' influence over time. These research designs add an inestimable contribution to guide interventions for dysfunctional developmental symptoms, such as borderline features (Burke & Stepp, 2012; Paris, 2005). Thus, the first aim of the current study was to identify trajectories of borderline features as a function of different groups. Specifically, we examined the trajectory of girls and boys separately, considering the amount of research indicating gender differences on borderline symptoms (Bradley et al., 2005; Carreiras, Castilho, & Cunha, 2020; Trull et al., 2010), as well as the trajectory of
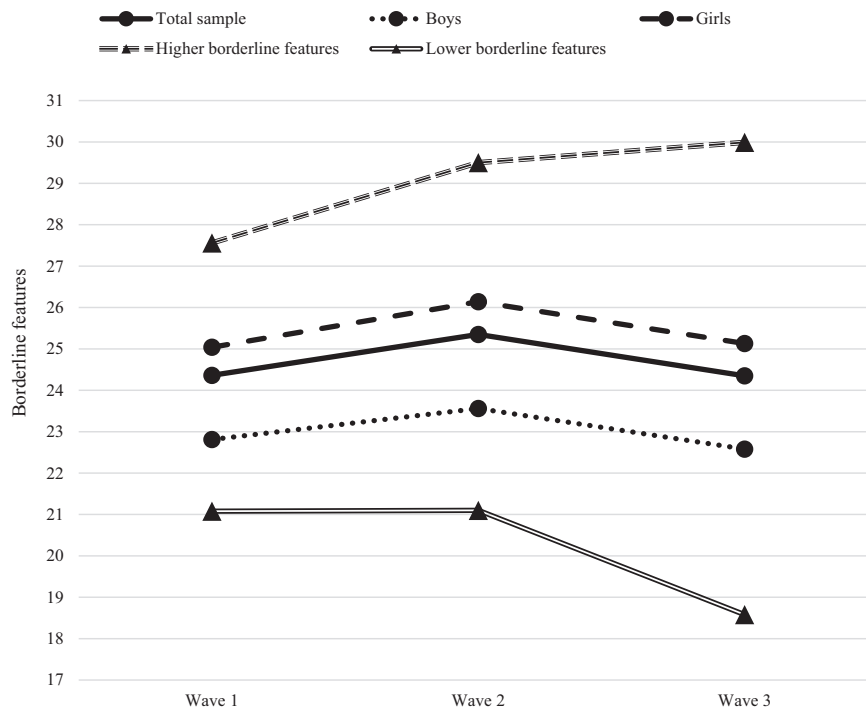
Fig. 1. Trajectories of the development of borderline features over 12 months in different groups of adolescents.

Table 2
Means (*M*) and standard deviations (*SD*) of borderline features in the three waves for adolescents with higher and lower borderline features. Student's *t*-test (*t*) for differences between groups and Cohen's *d* for effect sizes (*N* = 158).

	Higher borderline features (*n* = 80)	Lower borderline features (*n* = 78)	*t* (df)	*p*	*d*
	M (SD)	*M (SD)*			
Borderline features W1	27.56 (6.18)	21.08 (5.22)	7.12 (156)	<0.001	1.13
Borderline features W2	29.50 (6.47)	21.10 (5.84)	8.55 (156)	<0.001	1.36
Borderline features W3	29.99 (4.39)	18.58 (4.20)	16.68 (156)	<0.001	2.66

Note. *p < .05. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3. Borderline features measured by the Borderline Personality Features Scale for Children.

two groups, one with lower and other with higher borderline features. The second aim was to test the effect of gender and self-disgust on the evolution of borderline symptoms, considering the need to explore further the role of internal psychological mechanisms that might have a beneficial impact on developing these dysfunctional personality traits.

Our results seem to show that general borderline features tend to evolve in a relatively stable way in adolescence, considering the marginal non-significant differences between waves for the total sample. These findings align with previous works reporting slight changes and heterogenious trajectories for adolescent BPD (Bornovalova et al., 2013; Haltigan & Vaillancourt, 2016), however we need to keep in mind that we used a community sample. Future studies on this matter using community samples sould collect more representative and larger samples to attain more robust conclusions. Borderline features' stability appeared to be more evident for boys, who clearly showed non-significant differences across time. Haltigan and Vaillancourt (2016) also showed than the low/stable trajectory of BPD was mainly composed
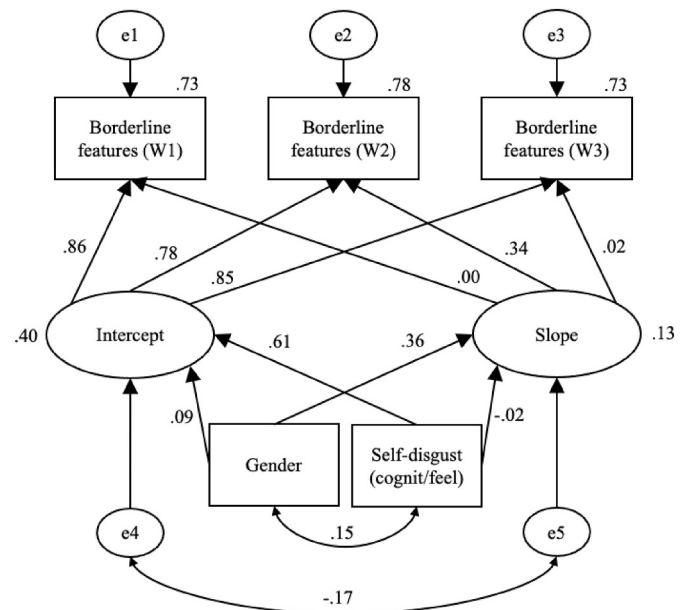

Fig. 2. The influence of cognitions/feelings of self-disgust and gender in borderline features' change.

of adolescent males. Girls exhibited a slight stability of borderline features due to some marginal non-significant differences between waves.

Two distinct trajectories were found when the sample was divided into two groups as a function of borderline features' levels. Adolescents with lower borderline features presented a slightly decreasing trajectory, suggesting mitigation of the intensity and frequency of borderline symptoms when they are already low. The opposite tendency was found in adolescents with higher borderline features, who presented a gradual increase over time. In addition, we could see a slight difference in the proportion of boys in these two groups. The group with lower borderline features had fewer boys than the group with higher borderline features,

which aligned with previous longitudinal studies (Haltigan & Vaillancourt, 2016). These results are also congruent with gender differences found between borderline features' levels in the different time points, with boys consistently exhibiting lower scores. Such findings were expected considering previous research works (Bradley et al., 2005; Carreiras, Castilho, & Cunha, 2020; Trull et al., 2010). Indeed, BPD is more prevalent in women, with a 3:1 female to male gender ratio, as described in the DSM-5 (American Psychiatric Association, 2013).

A LGM for the total sample showed that adolescents presented significant differences at initial borderline features, reflecting substantial variation among individuals at the baseline. That is, compared with each other adolescents might present considerably different levels of borderline features at a certain moment. However, such differences were not found in the growth rates, indicating that adolescents exhibited similar trajectories and paths in our sample. Stability over time in BPD has already been claimed in clinical samples (Greenfield et al., 2014) and in female adolescents (Bornovalova et al., 2013), and our results align with these reports. Furthermore, it is important to notice that our time frame was short (a year), so this stability must be carefully interpreted, and future studies are encouraged to replicate these analyses. Additionally, it seemed that adolescents with higher borderline symptoms at baseline showed a more noteworthy evolution of these traits. These data indicate that adolescents who already exhibit higher borderline features tend to present a greater development of those traits, supporting the imperative need for early detection and preventive measure for BPD.

Considering gender differences consistently reported by studies about borderline features and our interest in testing the role of cognitions and feelings of self-disgust, the LGM was conditioned by both variables. Results demonstrated that gender did not influence basal levels nor growth rates. Although this result was not expected, it might imply a similar pattern of borderline features between boys and girls.

By its turn, cognitions and feelings of self-disgust presented a significant effect of initial borderline features and in the growth rates, suggesting that this mechanism might work as a key factor to increase borderline features in youth. On the one hand, feeling repugnance and hate towards aspects of the self seems to influence borderline features, which is consistent with previous studies supporting the negative self-to-self relationship, often marked with self-hate, loathing and disgust. On the other hand, the same self-disgust feelings and thoughts appear to impact on borderline symptoms' evolution. Self-related feelings of disgust involve systematically looking down upon oneself and judging what one is, thinks, feels and does. This might increase self-harm behaviors, self-punishment, anger or depressive symptoms typical of BPD (Krawitz, 2012a). These findings have major clinical implications once they stress the need for clinicians to address the aversive self-to-self relationship when dealing with adolescents with persistent and pervasive borderline features. Whether individually or in groups, interventions based on developing feelings of self-reassurance, self-compassion, and self-soothing (e.g., Mindful Self-Compassion, Neff & Germer, 2013; Compassion-Focused Therapy, Gilbert, 2010) might be essential to prevent the development of these dysfunctional features (Krawitz, 2012b).

Some limitations are now acknowledged. The sample size and the considerable number of dropouts impose some attention when drawing conclusions. Even though our sample was above the recommended sample size of 50 (minimum of cases to obtain model convergence; Hamilton et al., 2003), future studies should further explore these findings in larger and more representative samples. Also due to the small sample size, we could not examine the development of borderline features considering the age diversity of our sample nor the parallel development of self-disgust with borderline features. In the future, studies should examine and control participants' age in longitudinal designs and with cross-lagged panel models test the effect of self-disgust on the escalation of borderline symptoms. Additionally, the one-year follow-up only allow us to look at the borderline features'

development in a short period of time, precluding sound conclusions on the broad evolution of these traits. Finally, only self-report measures were used, which usually entails some bias, for example, social desirability. Future studies could include more objective measures (e.g., clinical interviews) and other informant sources, such as parents or teachers.

Nonetheless, the current study has strengths and significant clinical implications. It was the first evidence of the negative effect of self-disgust on borderline features in adolescents, using longitudinal data. Our results emphasised the need to implement interventions capable of addressing the negative self-to-self relationship, and counteracting self-disgust. For example, compassion-based interventions for adolescents with higher borderline features might decrease the feelings of repugnance, hate and contempt about the self, through cultivating a compassionate and kind attitude in times of failure and suffering.

CRediT authorship contribution statement

Diogo Carreiras: Conceptualized, collected data, conducted statistical analyses, and wrote the original draft.
Marina Cunha: Reviewed and edited the final version and supervised the work.
Paula Castilho: Reviewed and edited the final version and supervised the work.

Compliance with ethical standards

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2022.111577.

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